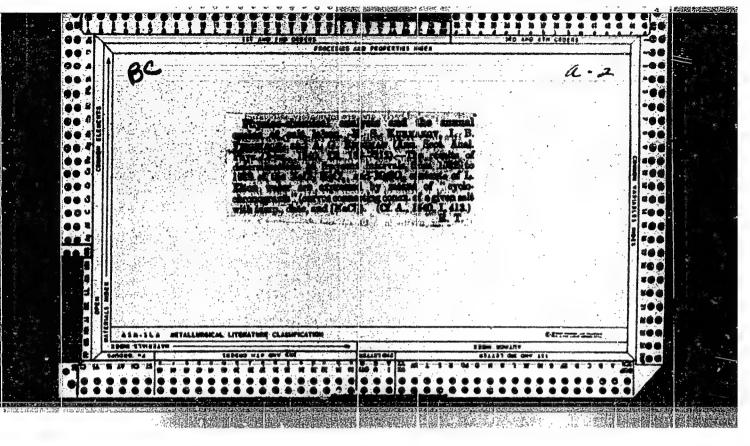
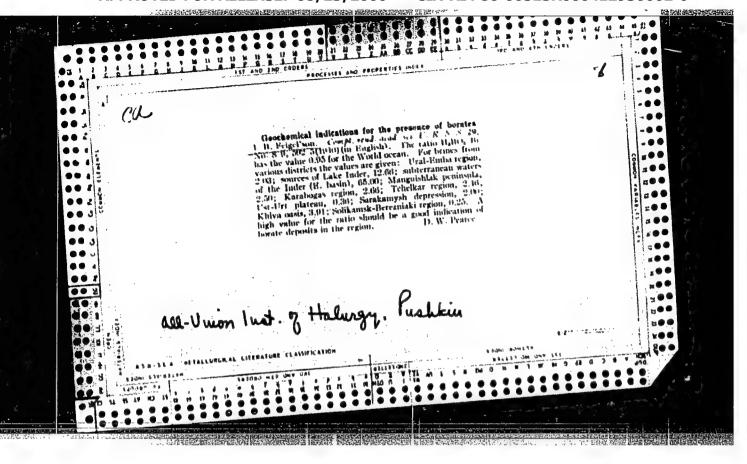


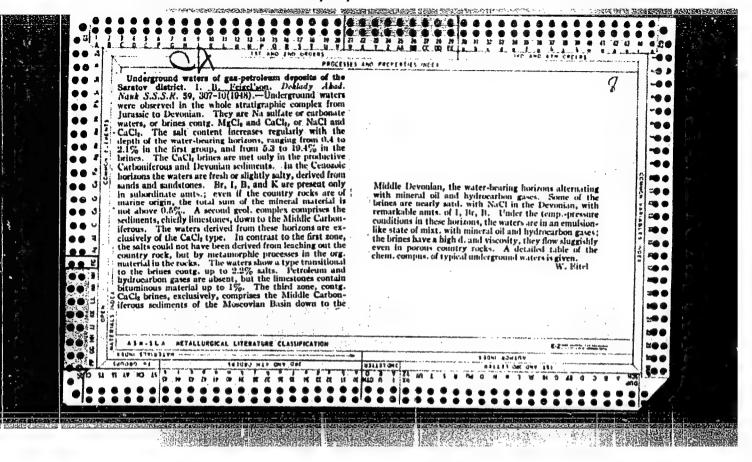
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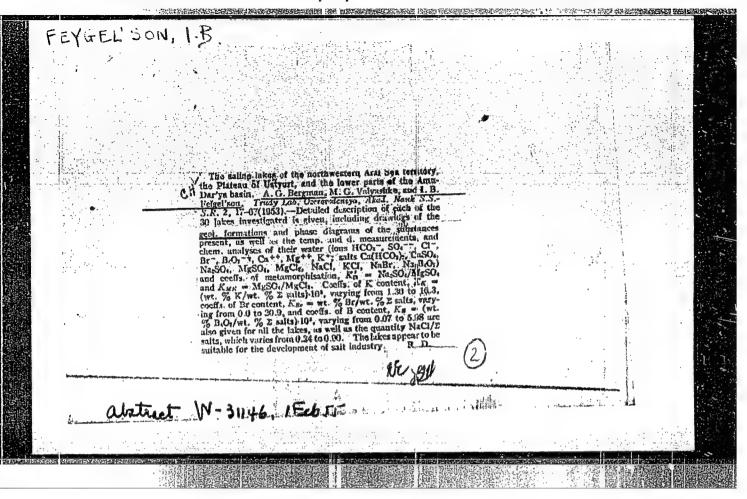


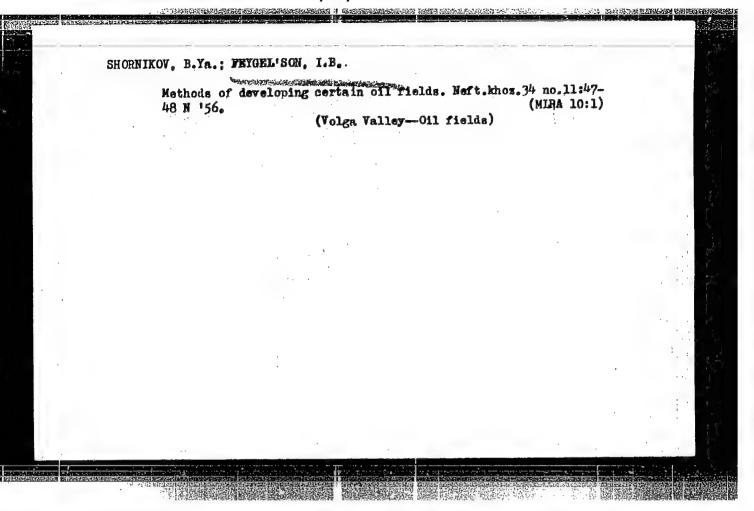
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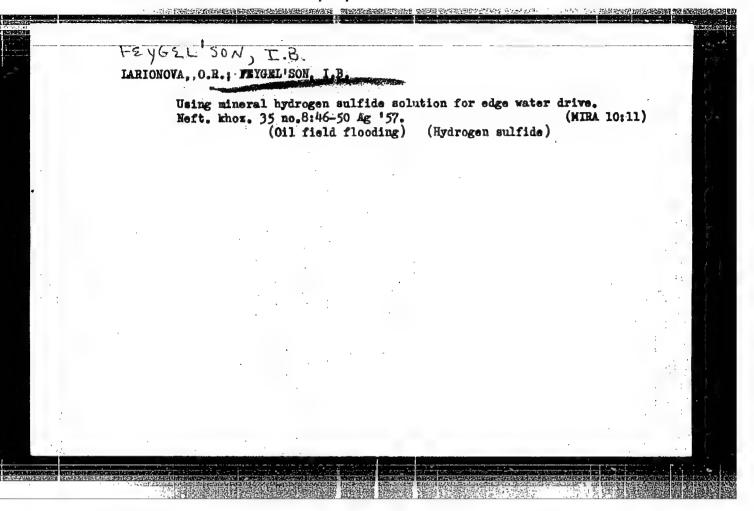
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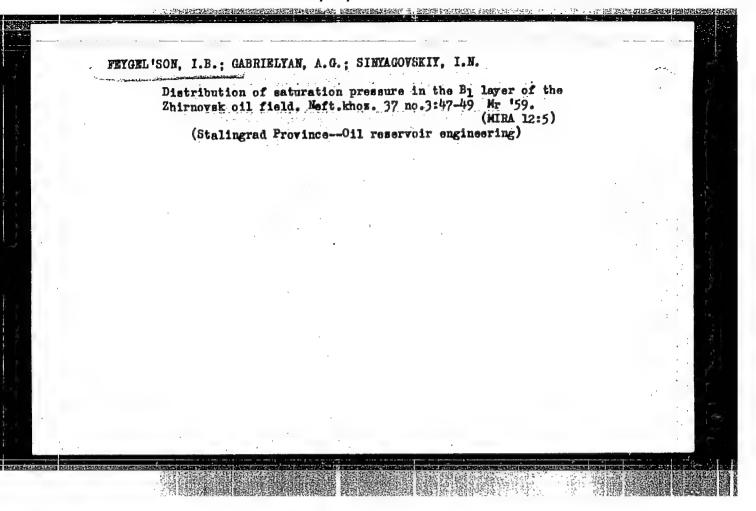


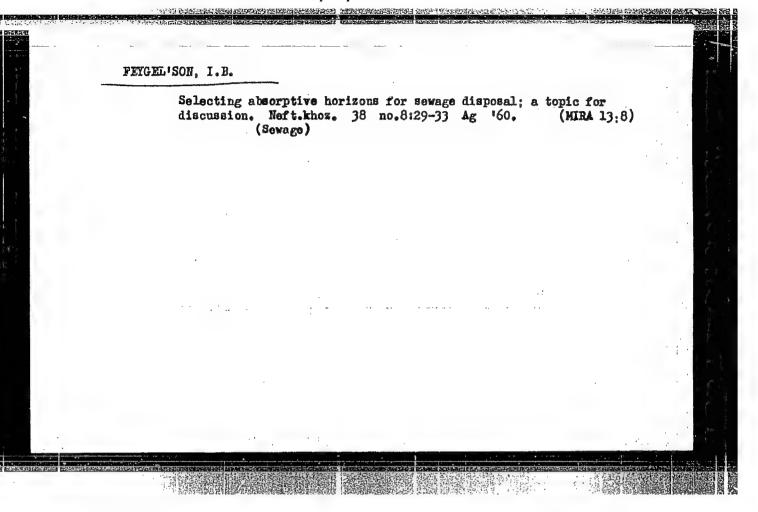


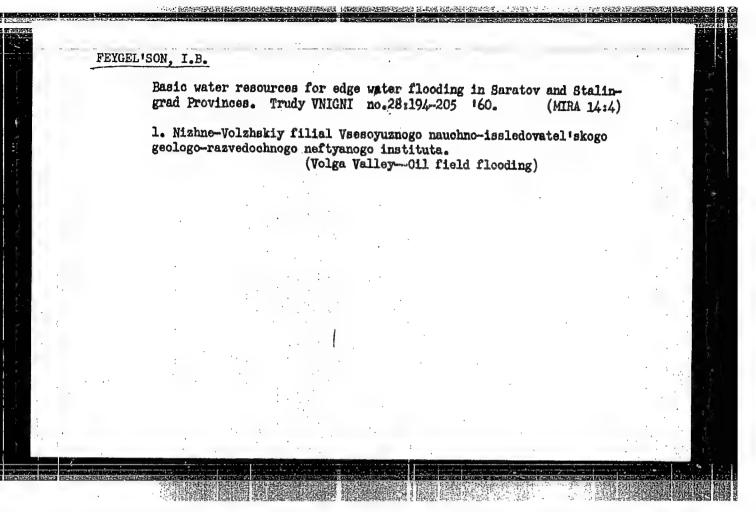


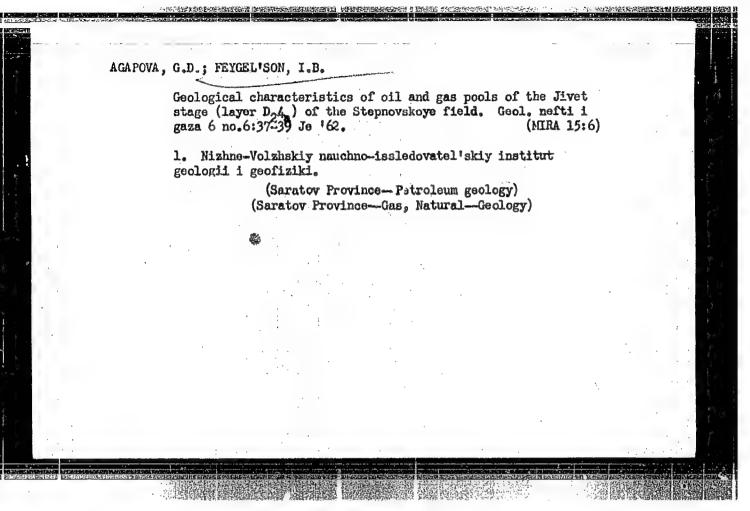


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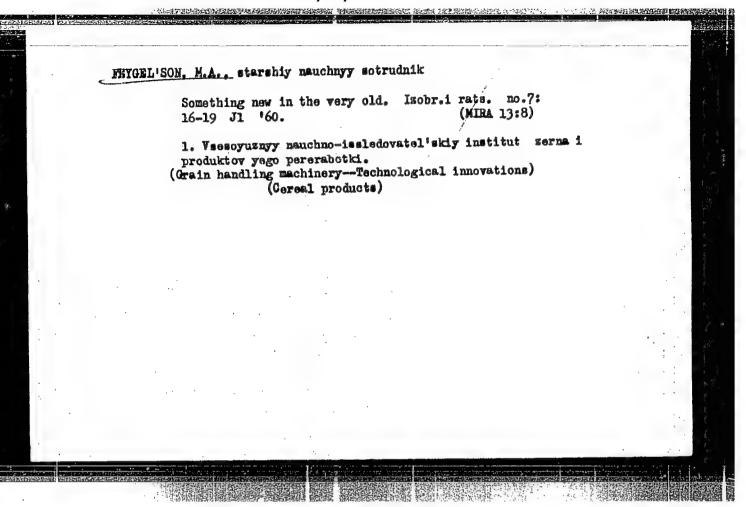
[Manual of consolidated indices of the cost of planning and research]
Sprayochnik ukrupmennyich pokazatelei stoimosti proektnykn i isyakateleiskich rabot. Wylditsia v deistvie s lianvaria 1958 g. Pt.8.

[Raterprises of the petroleum industry] Predpriiatiia meftiamoi uremyshlennosti. 1958, 28 p. Moskva, Gos. izd-vo lit-ry po stroit: arkhit.

(MIRA 11:8)

1. Russia (1923- U.S.S.R.) Gosudarstvennyy komitet po delam stroitelistva.

(Petroleum industry)



Obledenenie samoletov i bor'ba s nim. (Grazhdanskaia aviastsiia, 1940, no.1, p.8-10, illus.)

Title tr.: Icing of aircraft and the fight against it.

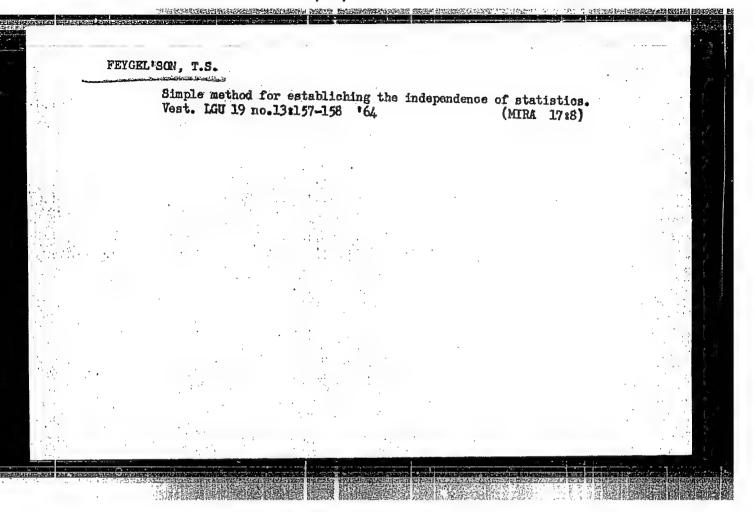
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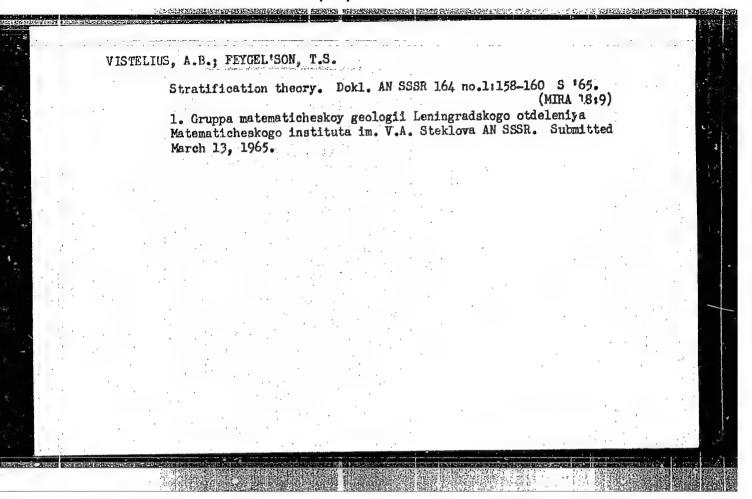
S0: Aeronautical Sciences and Aviation in the Soviet Union, Library of Congress, 1955.

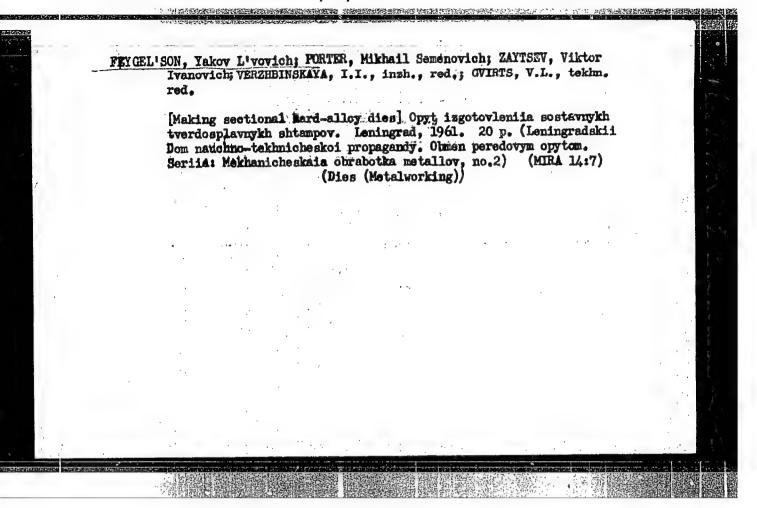
PEYGEL'SON, S. I., Engr. Cand. Tech. Sci.

Dissertation: "Frotection of Airplanes Against Icing." Moscow Order of Lenin Aviation
Enst imeni Sergo Ordzhonikidze, 9 Jun 47,

SO: Vechernyaya Moskya, Jun, 1947 (Froject #17836)



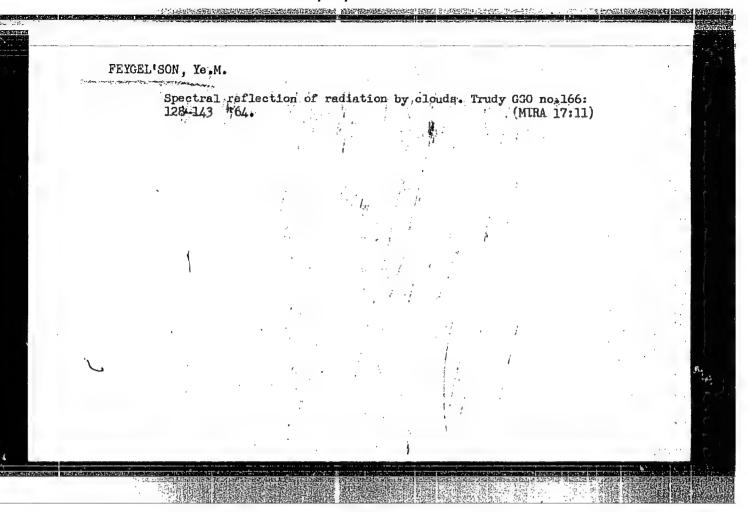




PETROVA, L.V.; FEYGEL'SON, Ye.M.

Role of radiation in the buildup of clouds. Izv. AN SSSR Ser. geofiz. no.8:1247-1252 Ag '64 (MIRA 17:8)

1. Institut fiziki atmosfery AN SSSR.



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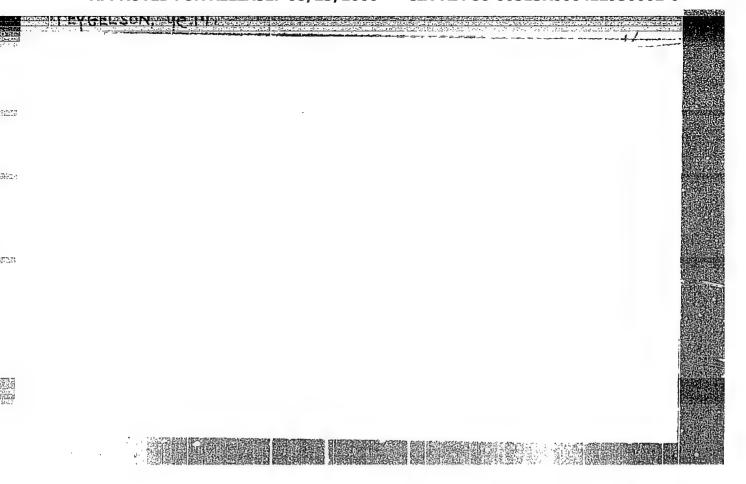
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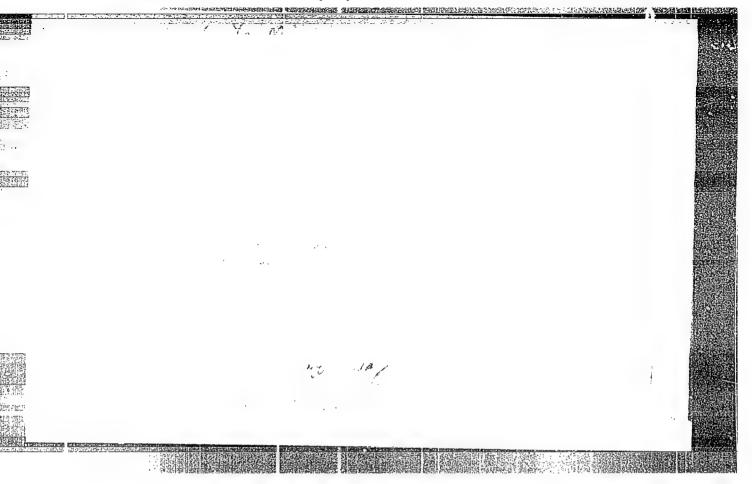
Dissertation: "Distribution of Temperature of the Earth's Atmosphere by altitude during Radiant and Vertical Turbulent Heat Exchange."

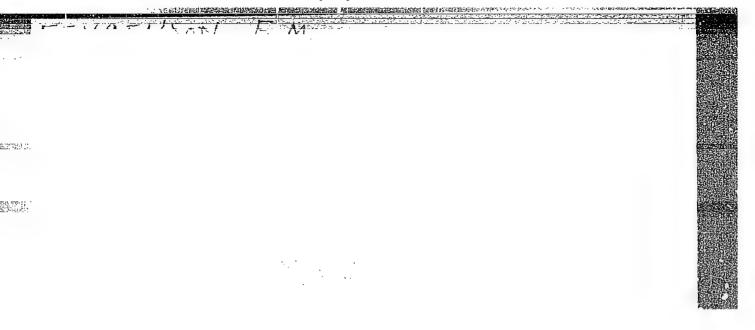
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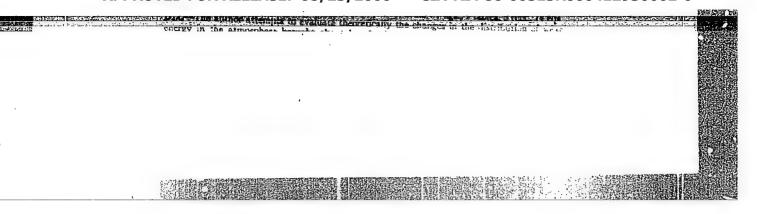
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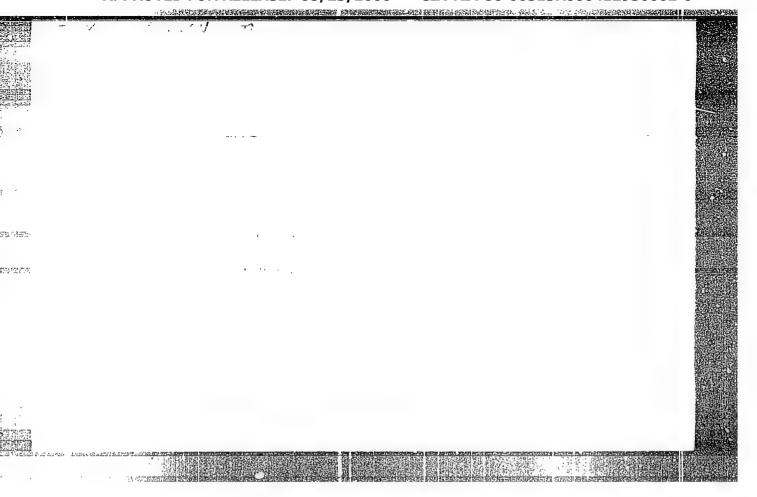
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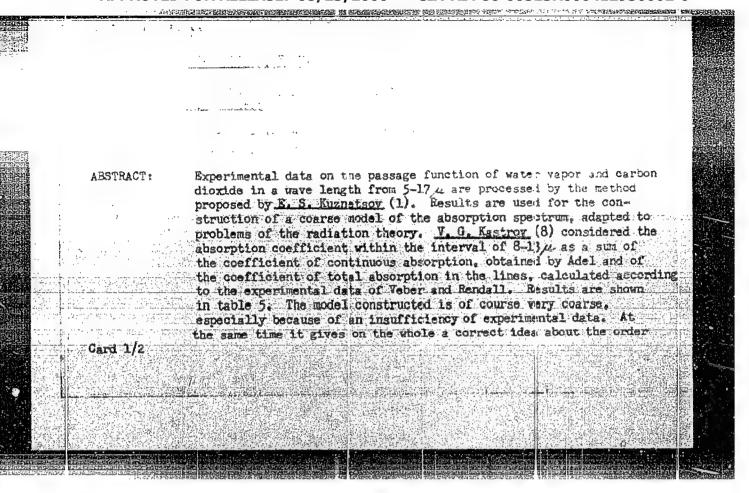












	each of them in the spectrum and made a certain degree of acturacy the in radial heat exchange. With the he it is possible to make the following into account the absopition select the spectrum with two absorption of a spectrum with three hoefficients.	values of the absorption coefficients, and about the place of of them in the spectrum and makes it possible to separate with artain degree of accuracy the intense R, responsible for the lal heat exchange. With the help of that model of the spectrum is possible to make the following step in the sense of the taking account the absorption selectivity by water vapor and pass from spectrum with two absorption coefficients (large and redium) to pectrum with three inefficients large, medium and small, luded are 11 tables and five figures.	
ASSOCIATION:	Osophysical Institute, Academy of		
SUBMITTED:	March 20, 1954		
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FEIGEL Sow, YE. M.
USSR/Geophysics - Heat exchange in the atmosphere

Card 1/1 Pub 45-7/18

Author : Feygel'son, Ye. M.

Title : Taking into account selective absorption in the theory of radiant heat-ex-

change in the atmosphere

Periodical: Izv. AN SSSR, Ser. geofiz. 3249-260, May-Jun 1955

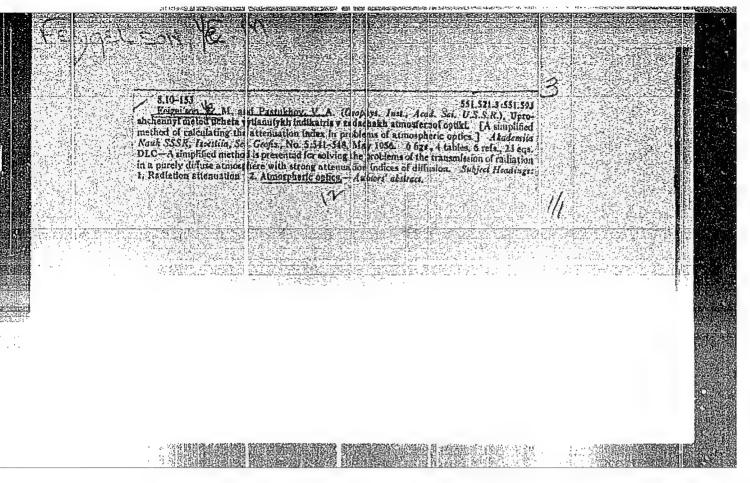
Abstract: The author investigates radiant heat-exchange of long-wavelength radiation in the terrestrial atmosphere under the assumption of the division of the absorption spectrum of water vapor into regions of small, medium and large values of the coefficients. He clarifies separately the role of large coefficients in the upper layers of the atmosphere. He thanks Ye. S. Kuznetsov. Four references: Ye. S. Kuznetsov, "Distribution of the temperature of the atmosphere along the vertical under radiant equilibrium," Trudy Instituta

teoretich. geofiziki, 1, 1946; Ye. M. Feygel'son, "Absorptive properties of water vapor and carbon dioxide in the atmosphere," Izv. AN SSSR, Ser. geofiz. No 1, 1955; K. Ya. Kondrat'yev, Perence dlinnovolnovogc izlucheniya v atmosfere (Transfer of long-wave radiation in the atmosphere), GITTL, Moscow-

Leningrad, 1950.

Institution: Geophysical Institute, Academy of Sciences USSR

Submitted: March 20, 1954



YE, MI.

60-37-3/7

AUTHOR:

Feygel'son. Ye. M.

TITLE:

The Effect of Clouds on the Thermal Equilibria in the

Atmosphere (Vliyaniye oblakov na teplovoy rezhim

atmosfery)

CIER WINAL

PERIODICAL: Trudy Geofizicheskogo instituta Akademii nauk SSSR,

1956, Nr 37(164), pp. 62-88 (USSR)

ABSTRACT:

The author examines the transfer of long-wave radiation in an atmosphere containing a homogeneous horizontal layer of clouds of finite thickness and computes the distribution of temperature in such an atmosphere when a state of radiative equilibrium exists outside the cloudy layer. The dispersion and absorption of longwave radiation in clouds with variants, the characteristics of solar radiation penetration in a cloudy atmosphere, and the selective character of the absorption spectra of vapor outside the clouds are considered. There are 2 tables, 7 figures, and 7 references, all

USSR.

AVAILABLE:

Library of Congress

Card 1/1

"The Approximate Methods of Evaluating the Scattered Light Intensity in the Earth's Atmosphere. The Results of Calculations for the case of Anisotropic Scattering," paper substited at International Assoc, of Meteorology Meetings, Toronto, Canada, 3-14 Sep 57

C-3,800,327

Eval... B-3,099,096

FEYGEL'SON, Ye.M

PHASE I BOOK EXPLOITATION

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3(7)

Akademiya nauk SSSR. Komitet po geodezii i geofizike.

Tezisy dokladov na XI General noy assambleye Mezhdunarodnogo geodezicheskogo i geofizicheskogo soyuza. Mezhdunarodnaya assotsiatsiya meterologii (Abstracts of Reports at the 11th General Assembly of the International Union of Geodesy and Geophysics. The International Association of Meteorology) Moscow, 1957. 38 p. /Parallel texts in Russian and English or French/ 1,500 copies printed. No additional contributors mentioned.

This booklet is intended for meteorologists.

COVERAGE: These reports cover various subjects in the field of meteorology. Among PURPOSE: the specific subdivisions discussed are: the heat balance of the Earth's surface, jet streams, transference of heat radiation, electric coagulation of cloud particles, turbulent diffusion, cloud studies, and others. Abstracts of all the articles are translated into either French or English. There are no references given.

TABLE OF CONTENTS:

The Heat Balance of the Earth's Surface Budyko, M.I. Card 1/3

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PHASE I BOOK EXPLOITATION

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Feygel'son Ye. M., M. S. Malkevich, S. Ya. Kogan, T. D. Koronatova, K. S. Glazova, and M. A. Kuznetsova

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Raschet yarkosti sveta v atmosfera pri anizotropnom rasseyanii, ch. 1 (Computation of Light Intensity in the Atmosphere in a Case of Anisotropic Scattering, Pt. 1) Moscow, Izd-vo AN SSSR, 1958. 101 p. (Series: Akademiya nauk SSSR. Institut fiziki atmosfery. Trudy, nr 1) Errata slip inserted. 2,000 copies printed.

Ed.: G. V. Rozenberg, Doctor of Physical and Mathematical Sciences; Ed. of Publishing House: V. I. Rydnik.

PURPOSE: This book is intended for physicists and scientists engaged in the study of atmospheric optics.

COVERAGE: This work contains the results of computation on the intensity of light scattered anisotropically in the atmosphere under various physical parameters and functions of scattering. The solution of integro-differential equations of the theory of radiative transfer in an anisotropically scattering medium Card 1/4

SOV/2545 Computation (Cont.) was obtained by the method of successive approximations. The work was carried out by the staff members of the Laboratory of Atmospheric Optics within the Institute of Physics of the Atmosphere, Academy of Sciences, USSR. No personalities are mentioned. There are 23 references: 14 Soviet, 4 English, 4 German, and 1 French. TABLE OF CONTENTS: 3 Introduction Ch. I. Mathematical Solution of the Problem 1. Statement of the problem. Derivation of basic rela-58 tionships The zero approximation 2. 11 Selection of the first approximation ∙3• 13 15 Computation of subsequent approximations Accounting for the albedo of the underlying surface 19 Ch. II. Processing Observation Data Card 2/L

2. Relation between the intensity of scattered and the solar altitude, transpareny of the atmospher and the form of the scattering function 3. Light reflection from the Earth's surface 4. The flux scattered radiation 5. Comparison with a case of isotropic scattering 6. Significance of multiple scattering 7. Explanation of the tables Table II Table III Table III		
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SOV/49 -58-10-7/15

AUTHOR: Feygel'son, Ye. M.

TITLE: On Interpreting Observations of Sky Brightness (Ob interpretatsii nablyudeniy yarkosti neba)

PERIODICAL: Izvestiya Akademii Nauk SSSR, seriya geofizicheskaya, 1958, Nr 10, pp 1222-1233 (USSR)

ABSTRACT: Observations on the brightness of scattered light are used extensively to determine the scattering properties of the atmosphere (Ref.1). The present article tries to explain the following points in interpreting the observational theory: 1) what information on the scattering function can be obtained from brightness measurements based on the theory of single scattering, 2) to what degree multiple scattering can be ignored, 3) how accurate a correction for multiple scattering can be made, using Ye. V. Pyaskovskaya-Fesenkova's method. The propagation of light in the Earth's atmosphere can be described by an equation of the form:

$$\cos \theta \frac{\partial I(\tau; r)}{\partial \tau} = \frac{1}{4\pi} \int I(\tau; r') \gamma (\tau; r; r') d\omega' - I(\tau; r) +$$

$$+\frac{s}{4}\exp\left[-\left(\tau^{*}-\tau\right)\sec\zeta\right]\gamma\left(\tau;\ \mathbf{r}_{0}\right)\tag{1}$$

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On Interpreting Observations of Sky Brightness

Here τ is the optical thickness of the atmosphere -

$$\tau = \int_{0}^{z} \sigma(z) dz -$$
 (2)

where $\sigma(z)$ is the scattering coefficient, I(t;r) is the intensity of radiation at a height z in a direction r (at an angle θ to the vertical and an azimuthal angle ϕ), γ is the relative scattering function and r' is the direction of propagation of scattered light. The scattering function depends on $\cos(r,\,r')=\cos 0\phi$. The atmospheric boundary conditions are given by Eq.(4), where q is the albedo of the Earth's surface and $F_1(\tau)$, $F_2(\tau)$ are the

integral functions of $I(\tau, r)$ shown. Multiple scattering is represented in Eq.(1) by the first term: if this is neglected, Eq.(5) results, which, using the boundary conditions Eq.(4) gives Eq.(6) for a level $\tau=0$. This can again be re-expressed in the forms Eqs.(7), (8) if $\gamma(t, \varphi)$ does

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On Interpreting Observations of Sky Brightness

not depend on height. As is shown in Ref.2, the scattering function of a real atmosphere changes considerably with height. Hence, the value of γ calculated from Eqs. (7) or (8) is called the relative scattering function averaged over the whole atmosphere. A more realistic average is that defined in Eq.(10); which transforms Eqs.(6) to the form (11), (12). Using the averaged scattering functions Eqs.(9) and (10), some information can be obtained on the change of $\gamma(t, \phi)$ with height for a given sky brightness at the Earth's surface. The atmosphere is assumed to consist of n layers in each of which γ is constant. Eqs.(9) and (10) are then written in the form Eqs.(13) and (14). If measurements are made of the sky brightness at sufficiently small time intervals for n points (θ_k, ϕ_k) and the resultant values substituted in Eqs.(13) and $(\overline{14})$, n equations are obtained to determine the scattering functions for the n layers with $\,\phi\,=\,\phi_{0}\,$. The system of equations has the form Eq.(17). Localization of the layers requires a knowledge of $\sigma(z)$. The role of multiple scattering is considered in relation to the data given in Ref. 3. The results are related Card 3/7 to an idealized two-layer model. The calculated brightness

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On Interpreting Observations of Sky Brightness is expressed in the form:

 $B(\tau; r) = B_I(\tau; r) + B_{II}(\tau; r)$, where B_I is the brightness due to first order scattering and B_{II} due to higher order scatterings. Table 1 gives values for $100B_{11}/B$ higher order scatterings. Table 1 gives values for the when $\tau = 0$, and Fig.1 shows the scattering indices for the two layers. Table 1 shows that the part played by multiple scattering increases with τ . The effect of multiple scattering is indicated even better in the case represented scattering is indicated even better in the case represented by Table 2. This gives the scattering function as defined by Table 2. This gives the scattering (dotted line in Fig.1) in Eq.(14) for a two-layered atmosphere (dotted line in Fig.1) in Eq.(14) for a two-layered atmosphere in $\Phi(0, \tau)$. Table 2 does together with the relative brightness $\Phi(0, \tau)$. Table 2 does not show the change in $\Phi(0, \tau)$ and $\Phi(0, \tau)$ this latter table indicates is represented in Table 3. This latter table indicates smaller values of $\Phi(0, \tau)$ then Table 2 and shows there is a value of $\Phi(0, \tau)$ for which $\Phi(0, \tau)$, $\Phi(0, \tau)$ and $\Phi(0, \tau)$ table 4 gives

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Card 5/7

SOV/49-58-10-7/15

On Interpreting Observations of Sky Brightness

the diminution m multiple scattering with height. The relative brightness $\overline{B}(\tau, r)$ and relative scattering function $\gamma(\phi)$ are those of the model atmosphere curve 2 in Fig.1. Table 5 gives the change in correction due to multiple scattering more accurately. The method of estimating the effect of multiple scattering worked out by Ye. V. Pyaskovs-kaya-Fesenkova can be put very simply for $\theta = \zeta$. Writing down Eq.(19) with the notations (20), (21) and (22) it is found that the substitution $B_{II} = a(\tau - \tau^*)$ can be made in Eq.(25) to give Eq.(26) (c.f. Ref.3). Table 6 gives values of B_{II} as a function of ϕ and ϕ for various values of τ^* , ζ and θ . Table 7 is taken from Ref.3 and gives values of the brightness $B(0,\zeta^*,\phi)$ for the values of Γ given in the first column, corresponding to the lower layer ($\Gamma=1.3$, in the upper layer). Values of $\gamma(\phi)$ calculated from Eq.(14) and $\gamma(\phi)$ by Piaskovskaya-Fesenkova's method are also given together with τ , which can be considered as the optical thickness corrected for multiple scattering. The following conclusions are drawn: (1) Single scattering formulae can be used for determining the scattering function when τ^* 0.15 with an error $\sim 10-15\%$, (2) Eq.(7) does not

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On Interpreting Observations of Sky Brightness

have a physical interpretation - it cannot be used for defining the scattering function averaged over the whole atmosphere. (3) For $\tau^*>0.2$, the brightness curve measured at the Earth's surface differs considerably from the average relative scattering index owing to multiple scattering. In this case, the part played by multiple scattering is considerably larger for directions $\phi>90^\circ$ than for $\phi<90^\circ$. (4) The effect of multiple scattering diminishes with height. At heights of 7-10 km the single scattering theory can be used for $\tau^*=0.4$ with greater accuracy than for $\tau^*=0.2$ in the surface layers. (5) Condition (23) is approximately fulfilled in the angular interval $30^\circ<\phi<130^\circ$. For

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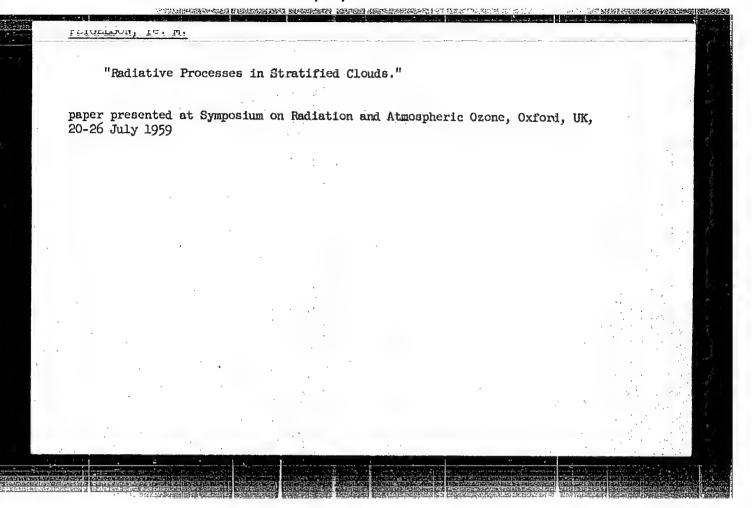
On Interpreting Observations of Sky Brightness

r*<0.4 and $\Gamma \le 2.5$, the error in Pyaskovskaya-Fesenkova's method does not exceed 15-20% for $\phi \le 120^\circ$. There are 7 tables, 1 figure and 4 references; 3 of the references are Soviet and 1 is English.

ASSOCIATION: Akademiya nauk SSSR, institut fiziki atmosfery (Academy of Sciences, USSR, Institute of Atmospheric Physics)

SUBMITTED: October 21, 1957.

Card 7/7



. AUTHOR: Feygel'son, Ye. M.

TITLE: The Radiation Cooling of Stratus Cloud.

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya geofizicheskaya, 1959, Nr 6, pp 347-857 (USSR)

T: The top layer of the stratus cloud in relation to the atmosphere above is considered. The variations of the tem-ABSTRACT: perature in the cloud are obtained from Eq (1) while those above it are obtained from Eq (2), where c - specific air temperature at constant pressure, $\rho(z)$ - air density, $T^{(o)}(z,t)$ - cloud temperature, t - time, $\rho_v(z,t)$ -(o)(z, t) - density of cloud density of cloud water drops. - damping coefficient of the water vapour (humidity), in water, $\alpha_{w,\lambda}$ - damping coefficient of wavelength λ $\lambda_{O} = 4\mu$ - lower limit of the range of wavewater vapour, lengths, $\lambda_1 = 40$, their upper limit, $I_{\lambda}^{(0)}(z, r, t)$ - intensity of radiation at wavelength λ in the direction r , dw primary angle, B, (T) - Planck function, L - latent heat

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The Radiation Cooling of Stratus Cloud

of condensation. Since the above equations contain the unknown magnitudes $T^{(0)}(z,t)$, $T^{(1)}(z,t)$, $T^{(0)}(z,r,t)$, $T^{(1)}(z,r,t)$, formulae (3) and (4) should be included. The solution of Eqs (1) to (4) is found for the following conditions:

 $T^{(j)}(z, 0), j = 0, 1,$ $I^{(0)}(H, r, t) = I^{(1)}(0, r, t),$ $I^{(1)}(z, r, t)/z = \infty = 0 \text{ at } 0 > \pi/2$

(H - thickness of cloud, θ - polar angle of direction r). Since the water vapour in the cloud is saturated, the function (5) can be defined, where $\mathbf{q}_{\mathbf{W}}^{(0)}(\mathbf{z}, \mathbf{t})$, $\mathbf{E}_{\mathbf{0}} = 6.1_{\mathrm{mb}}$ - saturation elasticity of water vapour at $\mathbf{0}^{0}\mathbf{C}$, $\mathbf{a} = 7.5$, $\mathbf{b} = 237.0^{\circ}\mathbf{C}$, $\mathbf{R}_{\mathbf{W}} = 460 \, \mathrm{m}^{2}/\mathrm{sec}^{2}$ deg - gas constant, \mathbf{t}^{*} -

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The Radiation Cooling of Stratus Cloud

temperature in degrees C (index 1 = atmosphere, index 0 = cloud). These conditions are applied in Eq (6) for the atmosphere above the cloud. The coefficient of damping for drops of 6.265 μ radius is taken from Ref 4, as illustrated in Fig 1, continuous line (the dotted line - data from Ref 5). This coefficient is calculated from Eq (7) where α_V - mean damping coefficient (Eq 8). The calculation shows that α_{V,λ}, given in Fig 1, can be substituted by α_V = 1000 - 1500 cm²/g. Then the value of A will be obtained with an accuracy of 3%. Thus Eqs (1) and (2) can be adjusted as Eq (9). Also, taking into account the thickness of the cloud, (Eq (10)), and the mass of a vertical column of water vapour in the atmosphere above the cloud, (Eq (11)), the final form of Eqs (1) and (2) can be written as Eqs (13) to (17). Fig 2 gives the values of E₁(T) and E(T). As an example, the following are given: T₀ = 275°, B₀ = 0.146 cal/cm²min, P_{W,0} = 4.9 x 10⁻⁶ g/cm³, P = 1.3 x 10⁻⁵ g/cm³, c_p = 0.24 Card 3/5 cal/g deg, t₀ = 24 hours, α_V = 1100 cm²/g, α_W = 1 cm²/g,

The Radiation Cooling of Stratus Cloud

 $\rho_{\rm v,o} = 0.5 \times 10^{-6} \, {\rm g/cm^3}$, then the values $a^{(o)} = 0.117$,

 $a^{(1)} = 13.1$, $b = 0.398 \times 10^{-2}$ are calculated from Eq (17)

for L = 590 cal/g. The formulae (13) and (14) can be obtained as the dimensionless equations (18) to (24), where $R(\tau, t)$ is the function of temperature (Fig 3). Table 1 illustrates the values of

 $T^{(0)}(\tau, t_1), \rho_w^{(0)}(\tau, t_1)$ and $\rho_v(\tau, t_1)$

at different points of the cloud. Table 2 gives the above values for the top boundary of the cloud for $\triangle t = 0.5 \text{ h}$. Table 3 gives the density of the drops (second column) and its upward rate of fluctuation (third column) for three types of cloud (first column): rain-cloud, cumulus-stratus,

Card 4/5

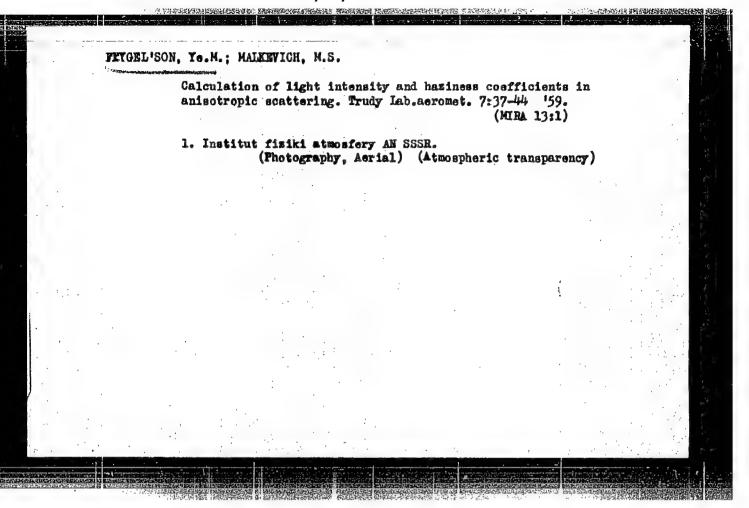
The Radiation Cooling of Stratus Cloud

and stratus (Ref 9). Fig 4 illustrates the increase of temperature due to the latent heat of condensation at four consecutive moments ($\Delta t = 0.5 \text{ h}$). There are 3 figures, 4 tables and 9 references, of which 8 are Soviet and 1 is English.

ASSOCIATION: Akademiya nauk SSSR, Institut fiziki atmosfery (Academy of Sciences of the USSR, Institute of Physics of the Atmosphere)

SUBMITTED: September 10, 1958.

Card 5/5



SOV/49-59-9-23/25

AUTHOR: Kastrov, V. G. and Feygel'son, Ye. M.

Conference on the Actinometry and Atmospheric Optics TITLE:

Izvestiya Akademii nauk SSSR, Seriya geofizicheskaya PERIODICAL:

1959, Nr. 9, pp 1435-1436 (USSR)

ABSTRACT: The Conference was convened in Leningrad on January 28

to February 4, 1959, by the Commission of Physics of the Atmosphere, Academy of Sciences, USSR, the Leningrad State University and Central Geophysical Observatory. Altogether 102 papers were presented. The separate sessions were devoted to: radiation, sky luminosity

and polarisation, reflective properties of the foundations surfaces, transition of atmospheric radiation, methods of actionometric measurements and radiation in industry. L. G. Makhotkin spoke on new

characteristics of the atmospheric turbulence; T. G. Berlyand described the distribution of solar radiation on the Earth; N. T. Chernigovsky, N. T. Rusin, T. V.

Kirillova, M. S. Marshunova, B. M. Gal'perin and M. K. Gavrilova dealt with investigations of radiation in the Arctic and Antartic; G. N. Faraponova, Yu. I.

Rabinovich, V. I. Myukhyur and G. P. Gushchin discussed Card 1/3 the decreasing of sunlight at 6 to 7 km high;

SOV/49-59-9-23/25

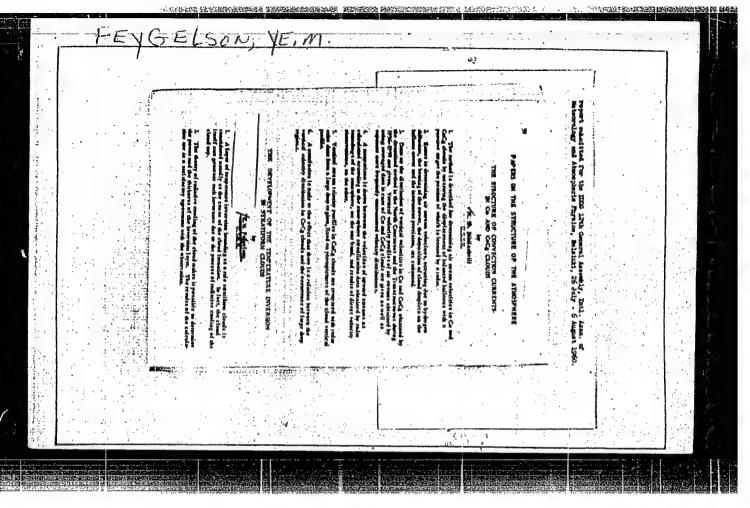
Conference on the Actinometry and Atmospheric Optics

O. D. Barten'yeva spoke on the determination of the indicatrix of light diffusion in ground surface layer of the atmosphere (apart maximum at O and 1800 an additional maximum 130 to 1450, corresponding to the rainbow, was defined); B. A. Chayanov described an automatic photometer with a range of 25 km; G. V. Rozenberg dealt with investigations of the angular diffusion of polarised light in the ground surface atmosphere; Ye. M. Feygel'son considered the cocling of cloud tops and its effect on precipitations. The other papers and their authors were as follows: K. Ya. Kondrat'yev - Carbon oxide in the atmosphere; I. N. Minin - Transfer of radiation affected by refraction; Yu. D. Yanishevskiy - Pyrheliometer as a radiation counter; V. S. Atroshenko and O. A. Avaste - Gn the Sobolev transfer equation in optics; K. S. Lyalikov, L. B. Krasil'shchikov, N. Ye. Tep-Markarvants, N. I. Goys, K. Ya. Kondrat'yev, Z. F. Mironova and L. P. Dayeva - Determination of Albedo and spectral luminosity; M. S. Malkevich - Reflecting

Card 2/3

Conference on the Actinometry and Atmospheric Optics

properties of the ground surface in relation to light diffusion in the atmosphere; V. G. Kastrov - Errors in determining the absorption of solar radiation in the atmosphere. The Conference approved the formation of a special commission for the revision of therminology. The addresses of two members of the commission are given.



PHASE I BOOK EXPLOITATION

SOV/5019

Georgiyevskiy, Yu. S., A. Ya. Driving, N. V. Zolotavina, G. V. Rozenberg, Ne. M. Feygel'son and V. S. Khazanov

Promhektornyy luch v atmosfere; issledovaniya po atmosfernoy optike (Searchlight Ray in the Atmosphere; Investigations in Atmospheric Optics) Moscow, Izd-vo AN SSSR, 1960. 243 p. Errata slip inserted. 1,600 copies printed.

Sponsoring Agency: Akademiya nauk SBSR. Institut fiziki atmosfery.

Ed. (Title page): G. V. Rozenberg, Professor; Ed. of Publishing House: N. L. Relesnin; Tech. Ed.: I. F. Koval'skaya.

PURIOSE: This book is intended for geophysicists concerned with searchlight sounding of the atmosphere and questions in atmospheric optics.

COVERAGE: The book reports on recent investigations of the effect of atmospheric conditions on the visibility of distant objects illuminated by a searchlight, and the utilization of a searchlight beam for investigations in atmospheric coptics. The authors limit themselves to that side of the problem directly

Card 1/64

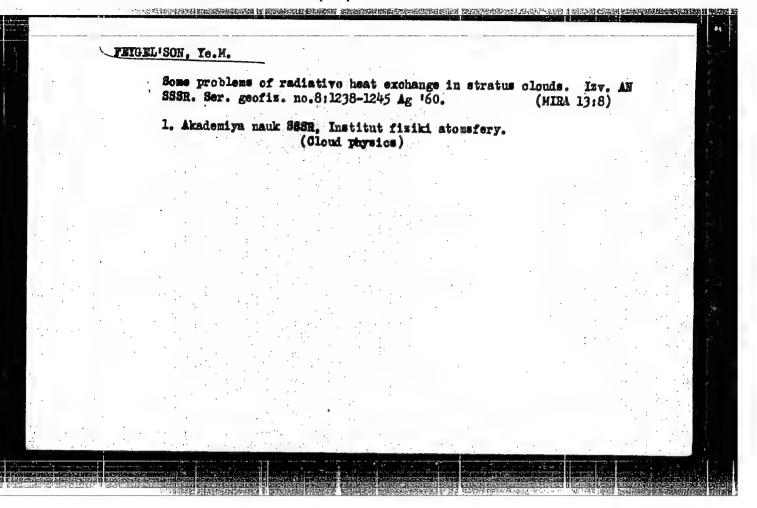
Searchlight Ray in the Atmosphere (Cont.)	SOV/ 5019	
connected with atmospheric conditions, but give a view of present-day data on the optical properties tention is concentrated on studies made by the aust the Isboratoriya atmosfernoy optiki Instituta nauk SSSR (Isboratory of Atmospheric Optics of the Atmosphere AS USSR). No personalities are mereferences: 100 Soviet, 38 English, 25 German, and	es of the atmosphere. At- ithors and their colleagues fiziki atmosfery Akademii he Institute of Physics of entioned. There are 173	The state of the s
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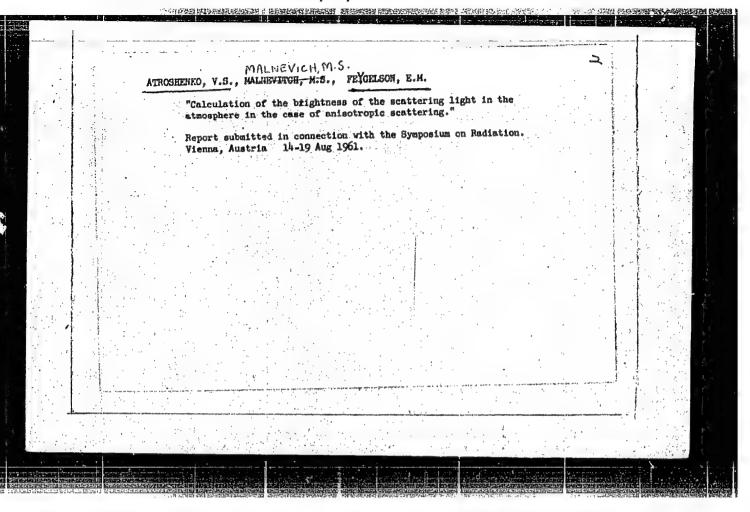
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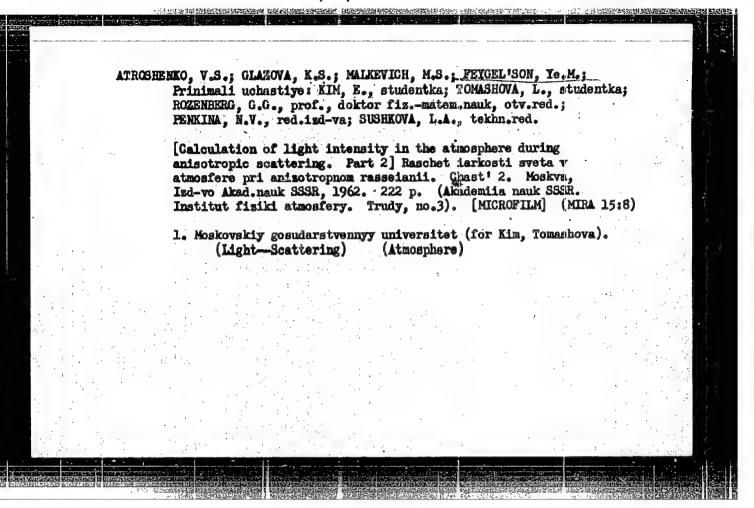
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\$/049/60/000/02/013/022 E032/E414 AUTHOR: Feygel'son, Ye.M TITLE: The Effect of Turbulence on the Radiation Cooling of Clouds W PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya geofizicheskaya, 1960, Nr 2, pp 299-308 (USSR) It is to be expected that weak turbulent mixing, which ABSTRACT: was neglected in the previous paper by the present author (Ref 1), would tend to reduce radiation cooling since the latter takes place in a very thin layer (Ref 1). The present paper is therefore concerned with the extension of the model discussed in Ref 1 to the case which includes turbulent heat transfer. The latter effect is estimated approximately. It is found that the turbulent mixing coefficient D (cm²/sec), which characterizes the turbulent heat transfer, lies between 2×10^4 and 50×10^4 cm²/sec. For such values of D, the radiation cooling near the cloud boundary is shown to be of the order of 0.1 to 1.7° per half-hour. Pure radiation cooling under these conditions is 6°/half-hour. Simple calculations show that turbulent mixing Card 1/2

s/049/60/000/02/013/022 E032/E414 The Effect of Turbulence on the Radiation Cooling of Clouds considerably weakens the radiation cooling process for the upper parts of the cloud and leads to an increase in the thickness of the cooling layer. The numerical calculations are summarized in Tables 1 to 3, in which the symbols are said to be defined in the previous paper (Ref 1). There are 1 figure, 4 tables and 6 references, 5 of which are Soviet and 1 English. ASSOCIATION: Akademiya nauk SSSR Institut fiziki atmosfery (Academy of Sciences USSR, Institute of Physics of the Atmosphere) SUBMITTED: February 24, 1959 Card 2/2







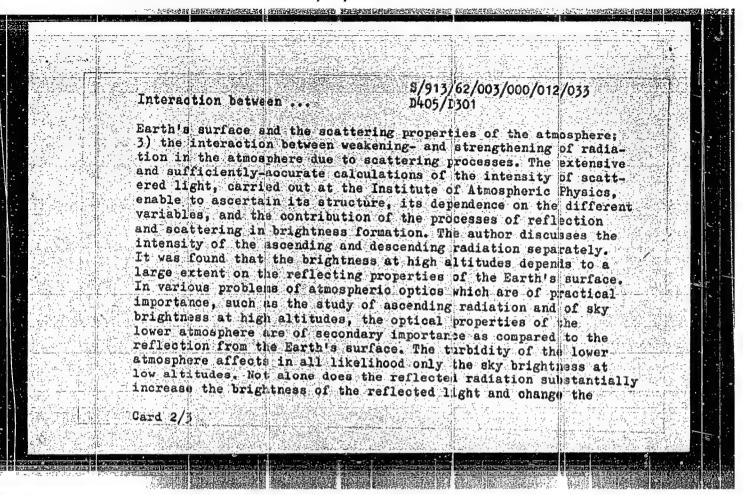
Dissertation defended for the degree of <u>Doctor of Physicomathematical</u>

<u>Sciences</u> at the Joint Scientific Council of the Geophysical Institute of the Academy of Sciences USR-Earth Physics, Atmospheric Physics, and Applied Geophysics in 1962:

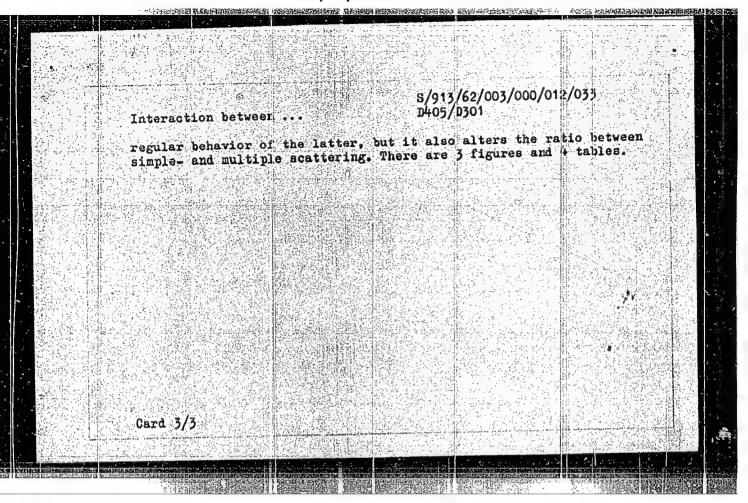
"Radiation Processes in Stratified Clouds."

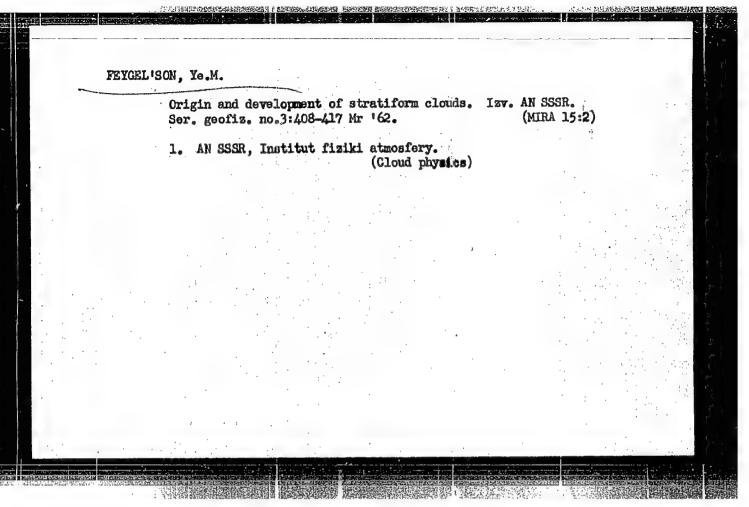
Vest. Akad, Nauk SSSR. No. 4, Moscow, 1963, pages 119-145

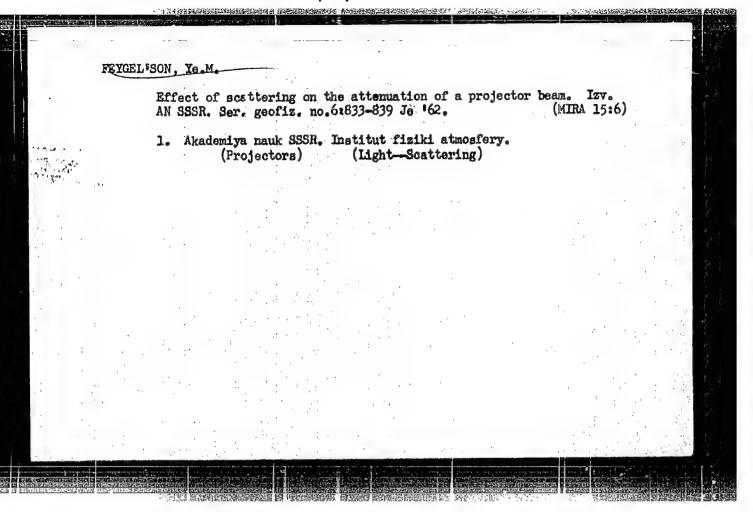
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AUTHOR	Faygel son, Ye. M.
TITLE:	Interaction between scattered- and reflected light of diurnal sky
SOURCE:	Akademiya nauk Kazkahskoy SSR. Astrofizicheskiy Institut. Trudy. v. 3. 1962. Rasseyaniye i polyarizatsiya sveta v zemnoy atmosfere; materialy Soveshchaniya po rasseyaniyu i polarizatsii sveta v atmosfere. 74 - 82
pendent varia are the optic angles of the affect the in direct solar	The intensity of the scattered light in a plans- sphere can be regarded as a function of three inde- bles and of four parameters; the independent variables al thickness of the atmosphere and the polar and azimuth direction of light propagation. The main factors which tensity are: 1) the relation between the fluxes of and descending scattered radiation at the Earth's sur- relation between the reflecting properties of the
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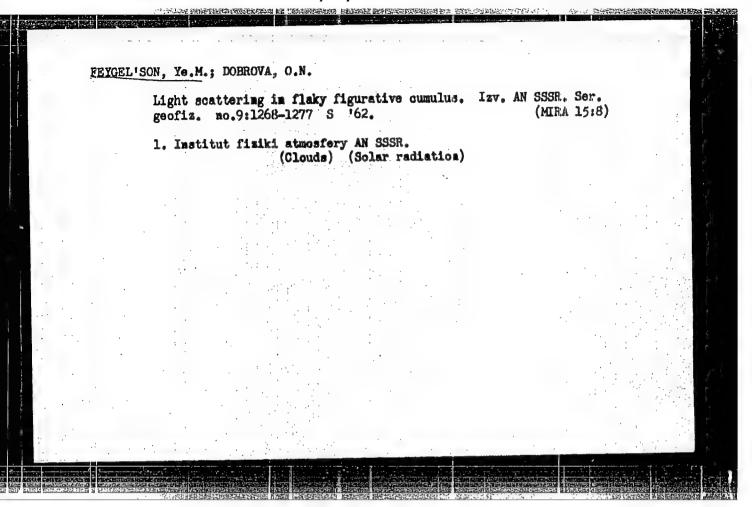


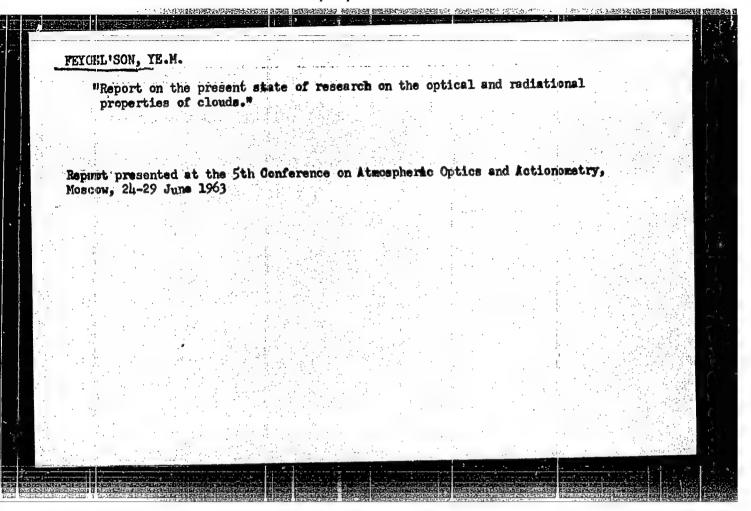
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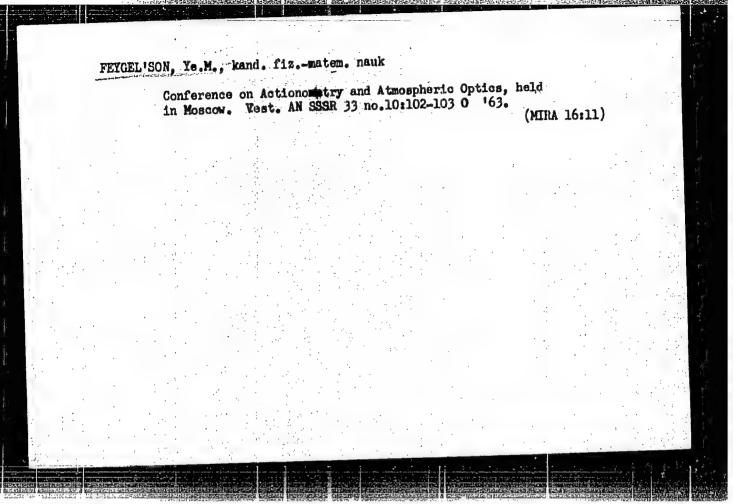


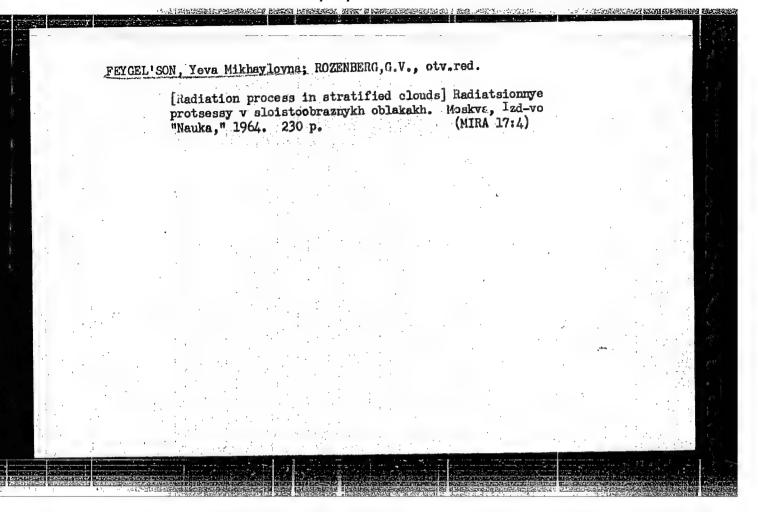


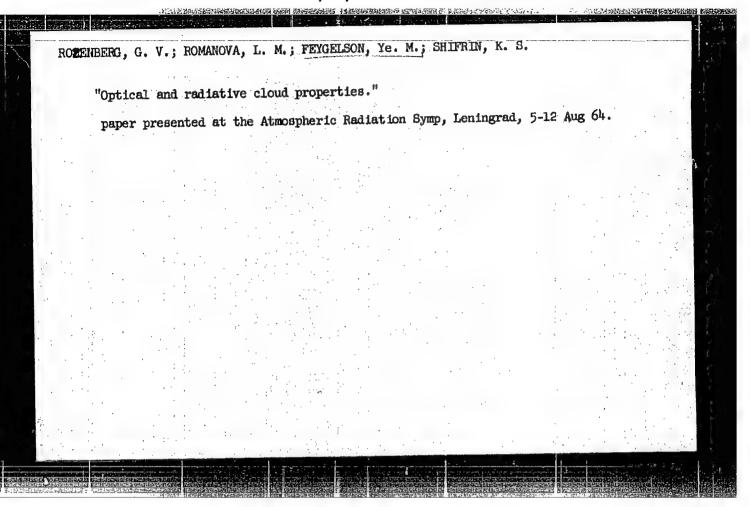






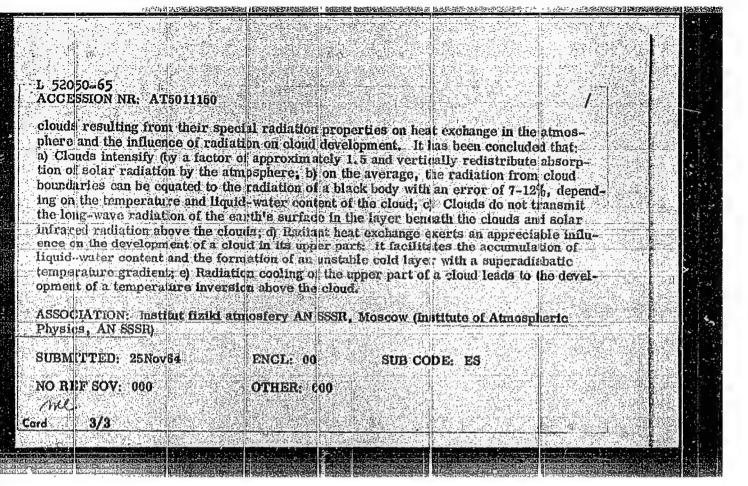






AUTHOR: Feygel'son, Ye. M. TITLE: Radiation and optical properties of clouds SOURCE: Mezhvedomstvennoye soveshchardye to aktinometril 1 optike atmosfery. 5th, Moscow, 1963. Aktinometriya 1 optika atmosfery (Actinometry and atmospheric optics); trudy soveshchaniya. Moscow, izd-vo Nauka, 1964, 9-10 TOPIC TAGS: cloud development, atmospheric optics, radiation absorption, atmospheric scattering, heat exchange, temperature inversion ABBTRACT: This is a summary of a report to be published in Kosmicheskiye seledovaniya, Vol. 2, No. 3, 1964. The institut fiziki atmosfery (Institute of Atmospheric Physics) has done considerable work on investigating the scattering and absorbing media. In particular, these investigations have been directed at the study of the optical and radiation properties of clouds. The work has been pursued in four directions by three specialists: L. M. Romanova has developed numerical methods in four directions by three specialists: L. M. Romanova has developed numerical methods for solution of the precise transfer equations, adapted for high-speed computers, and centum precise solutions, has obtained analytical expressions for the approximate solucerain precise solutions, has obtained analytical expressions for the approximate solucerd	L 52)50-65 ENT(1)/EWG(*)/FGG/EEC(t) P=-5/Pag-2/P1-4 GS/GW ACCESSION NR: AT5011150 UR/0000/64/000/0009/0010	39 37	
SOURCE: Mezivedomstvennoye soveshchariye to aktinometrii i optike atmosfery. 5th, Moscow, 1963. Aktinometriya i optika atmosfery (Actinometry and atmospheric optics); trudy soveshchaniya. Moscow, izd-vo Nauka, 1964, 9-10 TOPIC TAGS: cloud development, atmospheric optics, radiation absorption, atmospheric scattering, heat exchange, temperature inversion ABETRACT: This is a summary of a report to be published in Kosmicheskiye issledovaniya, vol. 2, No. 3, 1964. The institut fiziki atmosfery (Insultute of Atmospheric Physics) has done considerable work on tivestigating the propagation of radiant energy in strongly scattering and absorbing media. In particular, these investigations have been directed at the study of the optical and radiation properties of clouds. The work has been pursued in four directions by three specialists: L.M. Bomanova has developed numerical methods for solution of the precise transfer equations, adapted for high-speed computies, and ensuring high accuracy; Ye. M. Feygel'son, using Romanova's data for control and certain precise solutions, has obtained analytical expressions for the approximate solucerial		法不得 "我一切""我,我没有一点,要是	
SOURCE: Mezhvedomstvemoye soveshchaniye jo aktinometrii i optike atmosfery. 5th, Moscow, 1963. Aktinometriya i optika atmosfery (Actinometry and atmosphedic optics); trudy soveshchaniya. Moscow, izd-vo Nauka, 1964, 9-10 TOFIC TAGS: cloud development, atmospheric optics, radiation absorption, atmospheric scattering, heat exchange, temperature inversion ABETRACT: This is a summary of a report to be published in Kosmicheskiyd (seledovaniya, Vol. 2, No. 3, 1964. The institut fiziki atmosfery (Institute of Atmospheric Physics) is has done considerable work on investigating the propagation of radiant energy in strongly scattering and absorbing media. In particular, these investigations have been directed at the study of the optical and radiation properties of clouds. The work has been pursued in four directions by three specialists: L.M. Romanova has developed numerical methods in four directions by three specialists: L.M. Romanova has developed numerical methods for solution of the precise transfer equations, adapted for high-speed computers, and ensuring high accuracy; Ye. M. Feygel son, using Romanova's data for control and ensuring high accuracy; Ye. M. Feygel son, using Romanova's data for control and certain precise solutions, has obtained analytical expressions for the approximate solu-			
SOURCE: Mezhvedomstvemoye soveshchaniye jo aktinometrii i optike atmosfery. 5th, Moscow, 1963. Aktinometriya i optika atmosfery (Actinometry and atmosphedic optics); trudy soveshchaniya. Moscow, izd-vo Nauka, 1964, 9-10 TOFIC TAGS: cloud development, atmospheric optics, radiation absorption, atmospheric scattering, heat exchange, temperature inversion ABETRACT: This is a summary of a report to be published in Kosmicheskiyd (seledovaniya, Vol. 2, No. 3, 1964. The institut fiziki atmosfery (Institute of Atmospheric Physics) is has done considerable work on investigating the propagation of radiant energy in strongly scattering and absorbing media. In particular, these investigations have been directed at the study of the optical and radiation properties of clouds. The work has been pursued in four directions by three specialists: L.M. Romanova has developed numerical methods in four directions by three specialists: L.M. Romanova has developed numerical methods for solution of the precise transfer equations, adapted for high-speed computers, and ensuring high accuracy; Ye. M. Feygel son, using Romanova's data for control and ensuring high accuracy; Ye. M. Feygel son, using Romanova's data for control and certain precise solutions, has obtained analytical expressions for the approximate solu-	TITLE: Radiation and optical properties of clouds		
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L 52050-65 ACCESSION NE: AT5011150 solution of the precise transfer equations. The comparative simplicity of the formulas has made it possible to give the work a geophysical direction and to consider real cloud types. In addition to radiation ransfer, Ye. M. Feygel'sor has considered keat and moisture exchange in the atmosphere, investigating the radiation regime of clouds, the thermal effect of clouds on the atmosphere and the process of development of the cloud cover. G. V. Rozenberg has obtained an approximate solution of the transfer equation for an arbitrary form of the indicatrix, taking into account polarization effects in analytical form for cases when absorption is large of small in comparison with scuttering. The derived formulas make it possible to judge the absorption properties of matter from measurements of the brightness of radiation reflected from a layer of matter. Pasic information has been obtained or the reflection and transmission of solar radiation borizontally by homogeneous cloud layers as a function of position of the sun, optical thickness of clouds and mean drop size. Mean albedo of clouds has been determined and the angular distribution of reflected and transmitted radiation evaluated. Absorption has been found to be of decisive influence on the character of light reflection from clouds, especially in the region of weak absorption. At present, basic problems in the field of radiation transfer in clouds are taking into account the irregular form of the cloud surface and determination of the optical regime created by limited clouds distributed statistically in space. The investigation of the radiation regime has revealed the great influence of



ACCESSION NR: AP4043909

E/0049/64/000/008/1247/1252

AUTHOR: Petrova, L. V.; Feygel'son, Ye. M.

TITIE: Role of radiation in cloud development

SOURCE: AN SSSR. Izvestiya. Seriya geofizicheskaya, no. 8, 1964, 1247-1252

TOPICTAGS: cloud physics, atmospheric physics, atmospheric radiation, atmospheric longwave radiation, cloud formation, temperature inversion

ABSTRACT: In investigations of the origin and development of nonconvective clouds, it is customary to consider heat exchange and moisture exchange in the atmosphere brought about by vertical movements, turbulent mixing, and phase transformations of water. This paper differs in that, in addition to these factors, the authors also take into account the heat flux associated with the transfer of longwave radiation and the role of the latter in cloud formation. The method used in solving this problem was proposed by L. T. Matveyev and was described in an earlier paper by Ye.M. Feygel'son (Izv. AN SSSR, Ser. geofiz., no. 3, 1962). This article gives some numerical results showing the influence of a radiation heat flux on the variation in the liquid water content of a cloud. Computations, made with

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ACCESSION NR: AP4043909 a "Ural-1" electronic computer, revealed that a cloud develops upward under the influence of radiation cooling. It was also found that the contribution to water content from radiation decreases with an increase in the velocity of ascending movement. In this case the role of vertical movements as the principal factor in cloud formation is manifested. With an intensification of vertical movements the relative importance of the other factors is lessened. In the center of a cloud the effect of radiation is less than that of turbulence, but it is not negligible in comparison with the latter. In the upper part of a cloud, the role of radiation transfer is the dominant one. The generally-accepted mechanism of formation of stratus clouds, taking into account vertical movements and turbulent transport of heat and moisture, is thus shown to be incomplete. This result confirms the conclusion previously drawn by Feygel'son (Izv. AN SSSR, Ser. geofiz, no. 6, 1959 and no. 7, 1960) that radiation has a decisive effect on the formation of the upper layers of a cloud. The conditions imposed in these earlier studies (liquid water content does not decrease in the direction of the upper

boundary) made it possible to investigate directly the thermal effect of radiation, i.e., the development of a temperature inversion. In this new study the formulation of the problem is such that the liquid water content of a developing

Card 2/3

ACCESSION NR: AP4043909

cloud decreases rapidly in the direction of the upper boundary. Under this condition no inversion of radiation origin will occur. Orig. art. has: 27 formulas and 5 tables.

ASSOCIATION: Institut fiziki atmosfery*, Akademiya nauk SSSR (Institute of Atmospherio Physics, Academy of Sciences, SSSR)

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B/0293/64/002/003/0455/0461 ACCESSION NR: AP4041568 AUTHOR: Feygel'son, Ye. M. TITLE: Optical properties of clouds Kosmicheskiye issledovaniya, v. 2, no. 3, 1964, 455-461 TOPIC TAGS: cloud, atmospheric optics, meteorology, meteorological satellite, cloud optics, cloud albedo This article is a brief review of studies of cloud optics made at the Institute of ABSTRACT: Atmospheric Physics by Ye. M. Feygel'son, L.M. Romanova and G.V. Rozenburg; original sources are cited in the bibliography. Principal attention in the review is given to theoretical work on the transport of radiation in clouds, determining the laws of reflection and transmission of radiation by clouds, without taking into account the influence of the atmosphere outside clouds. In these studies the following conclusions were drawn. 1. In the visible part of the spectrum the scattered light of haze considerably distorts the light passing from the cloud to the upper boundary of the atmosphere. 2. The light of haze over clouds is not dependent on wavelength; this is true of cloud albedo as well. It therefore is impossible to Card

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			on the basis of a chan de can be brighter than		* *
clouds due to the doubtful if cloud le	greater thickness evels can be disti	and scattering capaci inguished on the basis	ty of the first. Therei of differences in their	ore it also is brightness.	
the region of azin	uthal angles 135°	$0 \le y \le 180^{\circ}$. In the 1	cloud is relatively unitatter case, in the even	t of low solar	
will be possible to	make use of this	s peculiarity, since it	rection of the horizon. also is characteristic ter ($\lambda = 0.76$ %) and or	of snow and	
the oxygen absorp of the optical thic	tion band can intr kness of the atmo	roduce an error of the esphere over the cloud.	order of 10-20% into d . 6. An opaque cloud	etermination can be con-	
"-1-1 - 1-1 - 1-1 - 1 - 1 - 1 - 1 - 1 -		ric window of transpar	ral range $(4.4 \le \lambda \le 744)$ rency $(844 \le \lambda \le 124)$ to	his error is x	
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(12 40). 15–25%. These co a listing of what the	onclusions, important author feels ar	rtant in the field of sai re highly important t us, 9 figures and 1 tab	unsolved problems in a	e followed by tmospheric ×	

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